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Decision Support for Chronic Wound Care

by

Shaunne Catherine Letourneau

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A thesis submitted to the Faculty of Graduate Studies and Research in partial

fulfillment of the requirements for the degree of Master of Nursing

Faculty of Nursing

Edmonton, Alberta

Fall, 1995

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Date: October 4, 1995

To my husband and life partner, Daniel

and my sons, Brian and David.

Abstract

Arriving at clinical decisions is a complex process and requires the assimilation and processing of relevant information and application of theoretical knowledge. In chronic wound care, factors which contribute to the complexity of decision making are the amount and relevance of client information and the multitude of treatment options. A decision tree assists with decision making by guiding the nurse through assessment and treatment options. Decision tree use and impact on accuracy of decision making for chronic wound care was studied in two groups of home care nurses; one two years post implementation, and one on initial decision tree contact. It was found that accuracy of decision making with use of the decision tree improved over time ($t=5.26$, $df=146$, $p<.001$) and on initial contact with the decision tree ($t=-2.55$, $df=45$, $p=.01$). Age, experience in nursing and home care, number of inservices attended, and number of chronic wounds treated, were not found to correlate with accuracy in either group.

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CHAPTER ONE

Introduction

Today's health care system is experiencing a multitude of changes in structure, setting, and practice. One factor driving these changes is the demand for more accountability in the use of dwindling health care resources. This need to be more accountable for resources has led to a focus on treatment outcomes and the need for research based practice. Of concern is the appropriate selection of effective nursing interventions which will provide the best possible outcomes. Hence, how nurses arrive at clinical decisions has been of interest to researchers over the past decade, including the development of expert computer systems that provide clinical decision support.

Clinical decisions made by nurses involve: (a) identification (diagnosis) of a client's health problems (including mitigating variables), and (b) selection of nursing interventions to help clients achieve short and long term goals (Corcoran-Perry, 1992). Arriving at clinical decisions is a complex process and requires the assimilation and processing of relevant information and application of theoretical knowledge (Tanner, 1987).

Numerous factors contribute to the complexity in clinical decision making. Foremost among these are the clients' dynamic responses and preferences relating to their health care concern. At best, nursing interventions and client outcomes are probabilistic rather than a certainty; that is to say, each decision has a greater or lesser chance of attaining a desired outcome (Hammond, 1966; Tanner, 1988). Factors which contribute to the complexity of decision making include the expertise of the nurse; the amount, accuracy, and relevance of the data; and knowledge/information available for addressing the health care issue

(Benner, 1984; Hammond, 1966). Certainly, advances in biomedical technology, improved understanding of human physiological response to pathological states, and the exponential rate of new knowledge, all contribute to the growing complexity of decision making required of nurses.

One nursing intervention which requires complex decision making is chronic wound care. The successful healing of chronic wounds depends on a multitude of factors, one of which is the product chosen to treat the wound. In the past ten years, product choices for chronic wound care have increased significantly, thus making decisions regarding the most appropriate treatment increasingly complicated. Therefore, how nurses' decision making regarding chronic wound care can be enhanced requires investigation.

In January, 1993 the Edmonton Board of Health Home Care Program introduced a chronic wound management decision tree (CWMDT), anticipating the use of this tool would increase the selection of appropriate products for wound care. A randomized trial conducted at the time of implementation showed that the CWMDT led to more accurate wound staging and product selection (Melchior-MacDougall, 1993). In Melchior-MacDougall's (1993) study, participants were randomly assigned to two groups: one group had the decision tree available for problem solving three pictorial case studies, the other group received only the pictorial case studies. Following data collection, all participants received an inservice regarding chronic wound care and participated in a practice session where the CWMDT was applied using mock wounds. The CWMDT became a protocol in the Edmonton Home Care Program following this inservice. It provided the standard of practice for chronic wound care and all city physicians were informed this protocol would be used by home care nurses. Subsequently, the

policy requiring physician orders for chronic wound care was deleted. A standard form for documentation of chronic wound assessment and treatment decisions was also introduced.

In February, 1993 a follow-up practice session reviewing the CWMDT use and an additional inservice regarding correct product use was provided. Each nurse had the opportunity for problem solving using the CWMDT and an open book examination was given. Examination questions, addressing wound healing theory, were reviewed by the clinical supervisor and returned to the nurse with comments and suggestions for additional reading where appropriate. For two months following the second intervention, clinical specialists in chronic wound care made joint visits with each nurse to assist in problem solving and to reinforce correct use of the CWMDT. Thus, all nursing staff were given an extensive orientation to the CWMDT over a three month period, including additional clinical support to reinforce learning and promote use of the CWMDT. All nursing staff hired since the introduction of the CWMDT have received an inservice on chronic wound care and an introduction to the chronic wound management decision tree during orientation.

Given the experience with the above project, the Edmonton Home Care Program was interested in developing other decision support tools. Before embarking on development of additional decision trees, it was important to determine whether the CWMDT continues to be used and whether the accuracy in staging and product selection has been maintained. Was the improvement in wound staging and product selection seen at the time of the implementation of the CWMDT simply a response to 'something new' or was a permanent change in practice obtained? Additionally, it was important to determine if

Melchior-MacDougall's (1993) results could be replicated in another population of home care nurses and to extend her study by assessing factors which may influence accuracy of decision making in chronic wound care.

Purpose of the Study

The purpose of this study was to (1) assess the use of the CWMDT over time, assess the accuracy of decision making two years after implementation of the CWMDT, and to investigate the relationship between accuracy of decision making in chronic wound care and several variables that may influence clinical decision making in the Edmonton Home Care Program population; and, (2) replicate Melchior-MacDougall's (1993) study and also investigate the relationship between accuracy of decision making in chronic wound care and several variables that may influence clinical decision making in the Calgary Health Services population. The specific research questions were:

1. Edmonton Home Care Program (EHCP)
    a. To what extent is the CWMDT still used in clinical practice two years after implementation in the Edmonton Home Care Program?
    b. What is the accuracy of the wound care staging and treatment choice two years post implementation of the CWMDT by Edmonton Home Care Program nurses?
    c. Has the accuracy of the wound care decisions increased, remained the same, or decreased since implementation of the CWMDT in the EHCP?
    d. To what extent is accuracy of decision making by nurses in the Edmonton Home Care Program predicted by experience with the CWMDT, years of experience in home care nursing and nursing in general, level of education, number of wound care inservices attended in

the past two years, number of wounds cared for per month, age, and confidence in accuracy of the nurses' decisions regarding product selection?

e. What factors affect the EHCP nurses' decision to use and/or not use the CWMDT in clinical practice?

2. Calgary Health Services (CHS)

a. Does the use of a CWMDT increase the accuracy of decision making by Calgary Health Services home care nurses in the staging and subsequent dressing product choice for chronic wounds?

b. To what extent is accuracy of decision making by Calgary Health Services home care nurses predicted by years of experience in home care nursing and nursing in general, level of education, number of wound care inservices attended in the past two years, number of wounds cared for per month, age, and confidence in accuracy of the nurses' decisions regarding product selection?

Significance of the Study

As health care reform and shrinking resources continue to challenge providers to focus on accountability and client outcomes, supports for nurses that assist in assuring appropriate and cost effective care will become imperative. Decision trees offer one mechanism for providing this support. However, before agencies invest resources in the development of decision trees, evidence of their effectiveness in supporting accurate decision making and potentially increasing clinical expertise is required. This study assists in providing such information.

CHAPTER TWO

Literature Review

The focus of the literature review is on decision analysis, decision trees, and decision tree effectiveness in accuracy of decision making in clinical practice.

Decision Analysis

Various critical thinking, clinical judgement, and decision making theories have been identified in the literature. These theories can be divided into two groups: (1) decisions made from a phenomenological perspective (Tanner, 1987), and (2) decisions made from a rationalist perspective (Harbison, 1991).

The phenomenological perspective on decision making is that decisions made in the same situation may vary depending on the person making the decision. Thus, a multitude of decisions are possible in each situation as the decision depends on what the decision maker chooses to observe, what they know, and from what perspective they are making their observations.

Decision analysis, a process developed at the Harvard Business School in the 1960's and used extensively by the business community when confronted with making complex decisions, employs the rationalist perspective (Raiffa, 1968). This analysis process has gained a broader application base and is currently being applied to complex client care issues by various health care professionals. Proponents of the rationalist perspective believe that client care situations should be assessed and analyzed, that subsequent actions be logical and rational, and that nursing judgements be explicit (Harbison, 1991). Harbison (1991) contends that a rationalist perspective parallels the current nursing trend toward 'research/rationale-based' nursing and accountability.

The decision analysis process breaks down a complex client care

circumstance into its component parts for individual analysis. These parts are then recombined to formulate a logical, temporal, and tangible sequence reflective of the whole. The result is often represented as a flow chart that documents a series of decision events. Each decision event impacts subsequent pathway choices and ultimately the probability of achieving a desired outcome (Jones, 1988).

A decision tree is a pictorial flow chart that captures key decision points where a choice(s) must be made from a number of available options. Each branch of the decision tree shows the associated consequences of selecting an option relevant to the identified situation. Following any one of the branches prompts the user regarding information required to make the choice, including professional knowledge and client assessment data. Therefore, a decision tree may be viewed as a tool which captures the essence of decision analysis and assists the user in sorting through the maze of interrelated decision components.

Decision Trees in Clinical Practice

Growing evidence supports the development and use of decision trees in the clinical setting to guide assessment, to assist in accuracy of decisions regarding treatment choice, and to reduce health care costs. Decision trees assist nurses in the collection of data that is more comprehensive and relevant to the client situation (Aspinall, 1979; Gamble & Hamilton, 1995; Mantel, 1992; Van den Berg & Visinski, 1992). Accuracy of treatment choice can be improved with the use of decision trees and this in turn may have a significant impact on resource utilization (Burns, Cunningham, White-Traut, Silvestri & Nelson, 1994; Gamble & Hamilton, 1995; Mantel, 1992; Melchior-MacDougall, 1993; Van den Berg & Visinski, 1992; Willey, 1990).

Of particular interest are two studies which examined the use of a decision tree in the clinical practice of wound care. In a quasi-experimental study, Willey and Swords (1991) looked at the decision making practices of nurses (N=93). The group was given three case studies to review and then identify an appropriate treatment plan for the wounds discussed in the studies. After completion of the control information, each subject was given one of the following support tools: (a) no decision support, (b) narrative reference tool which listed dressing supplies, (c) decision tree with a list of dressing choices, and (d) a list of dressing choices only. The case studies were reviewed by the subjects using one of the four decision support tools. Findings indicated that subjects with either the narrative reference tool or the decision tree made more accurate decisions than those without decision support. No significant difference was found between the narrative reference and decision tree in the number of people who made accurate choices. When looking at the level of confidence reported by subjects, those who had the decision tree were found to be significantly more confident in the accuracy of decisions than those without a decision tree. While the study was not directly examining subjects' perceptions of the various decision support tools, the researchers reported subjects stated they found the decision tree easy to use and others wanted to know when it would be implemented for use 'on the floor'.

In the second study, Melchior-MacDougall (1993) (Melchior-MacDougall & Lander, 1995) studied the utility of a chronic wound management decision tree (CWMDT) designed by Knight (1992). She examined CWMDT effectiveness in accurate decision making for client wound assessment and dressing product choice. Subjects (N=94) were randomly assigned to the treatment (CWMDT) or control (no CWMDT) groups. Each participant received a package containing

three pictorial case studies and were asked to stage the wounds and identify their dressing choice for each wound. Except for the presence or absence of the CWMDT, all packages were identical. Nurses in the experimental group were found to make more accurate assessments than those in the control group. Decisions concerning product choice were also more accurate for those subjects using the CWMDT. As well, the experimental group made significantly more accurate choices than those in the control group. However, factors which may influence the accuracy of decision making in clinical practice were not extensively examined.

Benefits of Decision Trees

Making decisions in a systematic, consistent manner has been shown to improve the quality of care, particularly when confronted with complex clinical situations (Grier, 1976; Shewchuk & Francis, 1988). Clinical practice guidelines must be based upon available scientific evidence and expert opinion (Burns et al., 1994; Dean-Baar, 1993; Tanner, 1989). Employing decision support tools provides knowledge of alternative options, as well as their consequences, and includes a consistent ordering approach (rules for action). Decision trees improve client outcomes through the use of consistent, standardized care (King, 1991; Lanza & Bantly, 1991). Additional positive benefits derived from using decision support tools include: efficient use of time, increased confidence in decision making (by reducing 'guess work' and by minimizing the 'trial and error' testing of care choices), provision of a learning tool to solve clinical problems, encouragement of efficient consultation among clinicians, and promotion of changes in professional practice behaviours (Akers, 1991; Lanza & Bantly, 1991; Nettleman, 1988; Tanner, 1988; Van den Berg & Visinski, 1992).

Disadvantages of Decision Trees

Decision trees are not without limitations. Of most interest has been the discussion about the usefulness of decision support for the novice versus expert practitioner. Benner (1984) identified use of decision trees as of more value to the novice or moderately experienced (advanced beginner) nurse, since the clinical performance characteristics for these practitioners demonstrate 'rule-governed' decision behaviours. More recently, Watson (1994) found that 'experienced' and more 'junior' nursing staff reported using experience as the foundation for their decisions in both an observed clinical setting and simulation case study. In fact, a low correlation existed between the number of years of experience (including courses taken) and the stated use of experience as the basis for the decision. Interestingly, those nurses with more experience verbalized their use of experience less than did the 'junior' nurse. One could argue that Watson's results support Benner's premise that experienced nurses are unable to verbalize their rationale. In contrast, Aspinall (1979) identified nurses with greater than 10 years experience benefited from the use of a decision tree because their knowledge base was outdated. Both the 'new' nurse and those with more than 10 years experience had the greatest benefits from following the decision tree.

Jones (1988) identified that decision trees provide limited opportunity to integrate multiple factors as a result of the necessity of breaking decisions into small components. Thus, there are limits to the number of decision factors and decision options that can be graphically depicted. She suggests that computerized decision support would allow the inclusion of more factors.

Accuracy of Decision Making

Accuracy of decision making in clinical situations is influenced by several factors. Experience and overconfidence have been identified as influencing the accuracy of decision making. Experienced practitioners make more accurate decisions than those with less experience due to the use of pattern recognition rather than sequential, rule based reasoning (Benner, 1984; Corcoran, 1986; Tanner, Benner, Chesla & Gordon, 1993). Wurzback (1991) and Melchior-MacDougall (1993) found that nurses who reported more confidence in their decisions, with or without the use of decision support, made the least accurate treatment choices. However, confidence and experience have only been examined separately, as to the effects on accuracy of decision making.

In addition to experience and confidence, other variables such as age, education, and expertise have been identified as increasing nurses ability to interpret clinical data correctly and make accurate treatment choices (Aspinall, 1979; Grier, 1984; Tanner, Padrick, Westfall & Putzier, 1987). Field (1987) further states that decision making accuracy is increased by mentoring and inservices.

Summary

The many advantages for the use of decision trees in clinical situations requiring complex analysis have been identified in the literature. Decision trees help to standardize treatment protocols and improve the quality of care through the timely delivery of the best known treatment choice in an efficient manner (Lanza & Bantly, 1991). There are however, gaps in knowledge pertaining to the development and use of decision trees. Only seven studies have been reported that examined the use of decision trees for clinical decision making in nursing (Aspinall, 1978; Burns et al., 1994; Gamble & Hamilton, 1995; Mantel, 1992; Melchior-MacDougall, 1993; Van der Berg & Visinski, 1992; Willey & Swords,

1991) and of these, only two examined their use in chronic wound care (Melchior-MacDougall & Lander, 1995; Willey & Swords, 1991). To date, no studies have been found that demonstrate the application/integration of a decision tree in clinical practice after initial introduction. Does the nurse continue to use the decision tree in clinical practice? If it is not used, why not? Does the accuracy of decision making change over time? Does standardization of practice lead to cost benefits? What is the relationship between confidence, experience, education, age, and accuracy of decision making with decision trees?

CHAPTER THREE

Method

Design

Edmonton Home Care Program

First, to assess the use of the chronic wound management decision tree (CWMDT) and accuracy of wound care decisions two years after its implementation, the Edmonton Home Care Program nurses completed three pictorial case studies without the aid of a hard copy of the CWMDT. Edmonton Home Care Program nurses current accuracy of wound care staging and treatment decisions were compared with Melchior-MacDougall's (1993) results. Accuracy of decision making was defined as correctly identifying the stage of the wound and the appropriate product for the wound dressing in response to the three pictorial case studies.

A questionnaire was also completed on variables hypothesized to influence decision making in clinical practice: age, education, average number of chronic wounds treated by the nurse per month, years of experience in home care, years of experience in nursing, number of wound care inservices attended in the past two years, confidence with chronic wound care decisions made in the study situation; and on factors influencing the use and nonuse of the CWMDT in clinical practice (Appendix A). Confidence in decision making was defined as the extent to which nurses believe they chose the most appropriate wound care product as determined by self-report on a ten point scale.

Calgary Health Services

Second, Melchior-MacDougall's (1993) study was replicated with Calgary Health Services home care nurses to verify the efficacy of the CWMDT in

promoting accuracy of decision making in the assessment and treatment of chronic wounds with this population. The participants were divided into two groups: Calgary Group A was given the decision tree to assist with assessment and product choice for chronic wounds (with CWMDT); Calgary Group B had no decision support tool physically available (no CWMDT). A questionnaire was also completed on variables potentially influencing decision making: age, education, average number of chronic wounds treated by the nurse per month, years of experience in home care, years of experience in nursing, number of wound care inservices attended in the past two years, and confidence with chronic wound care decisions made in the study situation (Appendix A).

Sample

Edmonton Home Care Program

All nurses in the Edmonton Home Care Program (EHCP) were asked to participate in the study (N=104). They comprised the Edmonton group. Sixty-one of the study participants were home care nurses who participated in Melchior-MacDougall's (1993) study and remain employed by the Edmonton Home Care Program. The remainder of the study participants (n=43) were Edmonton Home Care Program nurses who had not participated in Melchior-MacDougall's (1993) study but have had an inservice in chronic wound care, have had instruction on use of the CWMDT, and use the CWMDT in clinical practice. All nurses in the study make home visits to clients with a variety of health problems in the community. Chronic wound care is provided by all nurses, although the number on any given case load will vary and the experience any nurse has over the course of employment will also vary.

Calgary Health Services

Fifty-nine nurses employed by the Calgary Health Services comprised Calgary Group A (with CWMDT, n=31) and Calgary Group B (no CWMDT, n=28). These nurses provide treatments, including chronic wound care, to clients with various health concerns living within the Calgary city limits. They work full time, part time, and casual; have caseloads that vary by size, and have clients with a variety of functional and health limitations. They did not have access to the CWMDT and provide chronic wound care in the community based on policies and procedures provided by Calgary Health Services.

Instruments

Chronic Wound Management Decision Tree

The CWMDT used was designed by Knight (1992) based on research literature regarding chronic wound care. It is in a flow chart format with binary decision points to direct the nurse step by step regarding relevant data collection and subsequent product choices for wound care treatment. The decision tree was initially submitted by Knight (1992) to North American experts in chronic wound care and judged to accurately reflect current knowledge and practice in the chronic wound care domain. The tool was reviewed again by chronic wound care experts in February, 1994 and revised to reflect current knowledge and practice (Appendix B).

Pictorial Case Studies

The three pictorial case studies were developed by Willey and Swords (1991) (Appendix C). The procedure they used to establish validity of the instruments was: eight case histories were selected and provided to six experts who specialized in wound care. These six experts first identified the dressing

most effective in promoting wound healing and then rated the possible dressing choices in terms of appropriateness (absolutely contraindicated, inappropriate, neither appropriate nor inappropriate, appropriate and most appropriate). The experts then selected five cases that most represented the five stages of wound depth and complexity. Willey and Swords (1991) tallied the responses of the experts and selected the three pictorial case studies with the greatest consistency in dressing choice and that most effectively represented different stages of wound healing.

Melchior-MacDougall (1993) had these photographs reviewed by five local experts in wound care to confirm accuracy of staging and treatment choice. These experts rated the treatment choices in the same manner as the experts used by Willey and Swords (1991). This rating was then used to assess accuracy of the responses provided by the subjects with appropriate and most appropriate choices scored as correct answers and absolutely contraindicated, inappropriate, neither appropriate nor inappropriate scored as incorrect. The three pictorial case studies were used in Melchior-MacDougall's (1993) study conducted with the Edmonton Home Care Program nurses in January, 1993. Although the pictorial case studies have been seen before, there has been no discussion or publication of the correct or best answers.

The three pictorial case studies were reviewed for this study by three local experts in wound care to confirm the accuracy of staging and product choices. These experts rated the product and staging choices in the same manner as Melchior-MacDougall's (1993) experts.

Data Collection Procedures

Edmonton Home Care Program

First, the procedure with the Edmonton Home Care Program (EHCP) group was as follows:

- A letter with information about the study was posted in each of the three EHCP unit offices two weeks prior to conducting the study (Appendix D).
- At the beginning of a regularly scheduled nursing meeting, envelopes containing the questionnaire, three pictorial case studies, and answer sheets for each case study were distributed to each nurse.
- The researcher reviewed the cover letter attached to the envelope prior to instructing the nurse to begin. This letter explained the purpose of the study, provided directions for completing the case studies and questionnaire, and identified what the subjects were to do if they did not wish to participate in the study (Appendix E).
- Following the review of the cover sheet, the nurses were instructed to open the envelope and complete the questionnaire, followed by the three pictorial case studies. They were advised it would take approximately thirty minutes to complete the study.
- When the researcher observed that the nurses had stopped writing, she requested everyone return all study materials to the original envelopes.
- All envelopes were handed to the ends of each row where the researcher retrieved them.
- The envelopes were all placed in a box that was marked with the date and location of data collection.
- The group was thanked for participating and advised that the study results

would be available in each unit office of the EHCP upon completion of the study.

This procedure was repeated three times, once at each of the Edmonton Home Care Program unit offices over the course of one afternoon.

Calgary Health Services

Second, the procedure with the Calgary Health Services group was as follows:

- A letter with information about the study was posted in the Calgary Health Services office two weeks prior to conducting the study (Appendix D).
- As nurses arrived at the session site in the Calgary Health Services building, they were randomly assigned to Calgary Group A (with CWMDT) or Calgary Group B (no CWMDT) and given an envelope marked A or B. The contents of the envelopes were identical (questionnaire, three pictorial case studies, and answer sheets for each case study) (Appendix C), except for inclusion of a hard copy of the decision tree in envelopes marked Calgary Group A.
- Calgary Group A was instructed to sit on one side of the room and Calgary Group B was instructed to sit on the other side of the room to ensure no accidental access to the CWMDT by Calgary Group B.
- The researcher reviewed the cover letter attached to the envelope prior to instructing the nurses to begin. This letter explained the purpose of the study, provided directions for completing the case studies and questionnaire, and identified what the subjects were to do if they did not wish to participate in the study.
- Following a review of the cover sheet, the nurses were instructed to open the envelope and complete the questionnaire, followed by the three pictorial

case studies. They were advised it would take approximately thirty minutes to complete the study.

- When the researcher observed the nurses had stopped writing, she requested everyone return all study materials to the original envelopes.
- All envelopes were handed to the researcher.
- The envelopes were placed in a box that was marked with the date and location of data collection.
- The group was thanked for participating and advised that the study results would be available in the Calgary Health Services office upon completion of the study.

This procedure was repeated five times over the course of two days, once for each of the Calgary Health Services teams.

Ethical Considerations

This project was submitted to the Joint Ethics Review Committee, Faculty of Nursing and the Ethics Committees of the Edmonton Board of Health and Calgary Health Services. Following approval, a letter explaining the study was posted for all home care nurses in Edmonton and Calgary two weeks prior to a scheduled inservice day (Appendix D). A consent form (Appendix E) was attached to the envelope and the subjects were instructed to read this before the study began. Prior to the start of the study, the investigator explained the study and requested participation. Written consent was not required. Consent was implied by the completion of the study tools. Staff could refuse to participate by returning blank materials at the same time completed materials were handed in by those participating. Participation in the study was voluntary and anonymity of responses was guaranteed.

CHAPTER FOUR

Data Analysis

First, the use of the chronic wound management decision tree (CWMDT) over time, the accuracy of decision making two years after implementation of the CWMDT, and the relationship between accuracy of decision making in chronic wound care and several variables that may influence clinical decision making in the Edmonton Home Care Program population were assessed. Second, the relationship between accuracy of decision making in chronic wound care and several variables, including access to the CWMDT, that may influence clinical decision making in the Calgary Health Services population were examined. Data were statistically analyzed using SPSS for MS Windows Release 6.1. Content analysis of the qualitative questionnaire data was done and themes identified.

Edmonton Home Care Program and Calgary Health Services data are presented separately. A descriptive analysis of each of the study variables is provided. Scores for accuracy of decision making were the sum of correct staging of the wound and correct treatment choice. For analysis purposes, answers regarding staging were coded as correct or incorrect and those regarding treatment were coded as correct (best or appropriate) or incorrect (contraindicated, inappropriate, or neither appropriate or inappropriate). As there were three pictorial case studies, the range of scores for each subject is from zero to six. In addition to determining total accuracy scores, accuracy of staging and product choice were analyzed for each of the pictorial case studies.

Edmonton Home Care Program

Sample Characteristics

One hundred and four nurses from the Edmonton Home Care Program (EHCP) participated in this study. Sixty-one of these nurses had participated in the original study conducted by Melchior-MacDougall (1993) (hereafter referred to as Melchior-MacDougall study participants), and 43 of the nurses had not, (hereafter referred to as Melchior-MacDougall study non participants). The majority of Melchior-MacDougall study non participants were not employed by the Edmonton Home Care Program at the time of her study. Sample characteristics of the Edmonton Home Care Program participants are presented in Table 1. These characteristics are presented for the total Edmonton Home Care Program participants (N=104), for Melchior-MacDougall study participants (n=61), and Melchior-MacDougall study non participants (n=43). There were some statistically significant differences between the Melchior-MacDougall study participants and study non participants characteristics as determined by t-test or Chi-square analysis, where appropriate.

Overall, the mean age of the total Edmonton Home Care Program participants was 37.57 years (SD=9.70), with a range of 22 to 62 years. It was noted that 51% (n=21) of the Melchior-MacDougall study non participants were under 30 years of age, while only 9 % (n=5) of the Melchior-MacDougall study participants fell into this category. Conversely, 34% (n=19) of the Melchior-MacDougall study participants and 7% (n=3) of Melchior-MacDougall study non participants were over 45 years of age (t=5.59, df=96, p=.000).

There was a wide range in years of experience in nursing reported for the total Edmonton Home Care Program participants (1-40 years), with a mean of

13.76 years (SD=7.99). While 42% (n=16) of Melchior-MacDougall study non participants had less than five years experience in nursing, only two percent (n=1) of Melchior-MacDougall study participants fell into this category (t=-5.08, df=96, p=.000). The years of experience in home care nursing for the total Edmonton Home Care Program participants ranged from 0 to 16 years, with a mean of 5.27 years (SD=3.74). The majority of the Melchior-MacDougall study non participants had less than one year experience (60.5%, n=26), while the majority of Melchior-MacDougall study participants had six or more years of experience in home care nursing (54%, n=33) (t=-9.36, df=99, p=.000).

The majority of the total Edmonton Home Care Program participants work 35 hours per week, which is full time employment with the EHCP. Seventy-four percent (n=42) of the Melchior-MacDougall study participants work full time, while 58% (n=25) of the Melchior-MacDougall study non participants work full time.

Edmonton Home Care Program participants had attended zero to four inservices on chronic wounds in the past two years. Fifty-nine percent of the Melchior-MacDougall study non participants had attended only one inservice on chronic wounds in the past two years, while 59% of the Melchior-MacDougall participants had attended two to four wound care inservices.

Table 1

Edmonton Home Care Program: Subject Characteristics

	N	Mean	SD	Median	Range
Age (years)					
Melchior-MacDougall Study Participants (1993)	56	41.71*	7.99	40.50	27-62
Melchior-MacDougall Study Non Participants	42	32.06*	9.06	32.06	22-53
Total EHCP Participants	98	37.57	9.70	37.50	22-62
*t=-5.59, df=96, p=.000					
Experience in Nursing (years)					
Melchior-MacDougall Study Participants (1993)	60	16.67*	7.45	17.0	5-40
Melchior-MacDougall Study Non Participants	38	9.16*	6.57	7.50	1-25
Total EHCP Participants	98	13.76	7.99	12.0	1-40
*t=-5.08, df=96, p=.000					
Experience in Home Care (years)					
Melchior-MacDougall Study Participants (1993)	61	6.41*	3.55	6.0	2-16
Melchior-MacDougall Study Non Participants	43	2.30*	2.36	3.0	0-8
Total EHCP Participants	104	5.29	3.79	4.0	0-16
*t=-9.36, df=98, p=.000					
Hours of Work (per week)					
Melchior-MacDougall Study Participants (1993)	57	31.25*	8.87	35	7-45
Melchior-MacDougall Study Non Participants	43	30.86*	7.42	35	14-40
Total EHCP Participants	100	31.08	8.24	35	7-45
*t=-.23, df=98, p=.818					

Table Continues ...

Table 1 - Edmonton Home Care Program: Subject Characteristics - Cont'd

	N	Mean	SD	Median	Range
Number of Wound Care Inservices Attended (1993-1995)					
Melchior-MacDougall Study Participants (1993)	61	1.77*	1.01	2	0-4
Melchior-MacDougall Study Non Participants	42	1.48*	.77	1	0-4
Total EHCP Participants	103	1.65	.93	2	0-4

*t=-1.60, df=101, p=.113

Edmonton Home Care Program participants were predominantly prepared in nursing at the baccalaureate level (87.30%, n=102). More of the Melchior-MacDougall study non participants (95%) had a baccalaureate degree than the Melchior-MacDougall study participants (85%) (Table 2).

Table 2

Edmonton Home Care Program: Subjects Nursing Education

	N	RN	BScN	MN	OTHER
Melchior-MacDougall Study Participants (1993)	60	15.0%*	81.7%*	1.0%	1.0%
Melchior-MacDougall Study Non Participants	42	4.8%*	95.2%*	0%	0%
Total EHCP Participants	102	10.8%	87.37%	1.0%	1.0%

*Chi-square=4.322, df=1, p=.229

Use of the CWMDT in Clinical Practice

To determine to what extent the CWMDT was still used in clinical practice two years post implementation, study participants were asked to report the number of clients cared for each month and the number of times they physically or mentally used the CWMDT to guide decision making. The number of clients

per month with chronic wounds for the total Edmonton Home Care Program participants ranged from 0 to 45 (M=3.87, SD=5.85) and 25% of participants (n=21) saw no clients with chronic wounds in the month preceding the study and therefore did not use the CWMDT (Table 3). More clients with chronic wounds were seen by Melchior-MacDougall study non participants than by Melchior-MacDougall study participants. Twenty-eight percent (n=12) of Melchior-MacDougall study non participants saw 10 or more clients per month for chronic wound care whereas only two percent (n=1) of Melchior-MacDougall study participants saw this number (t=2.92, df=45.93, p=.005).

Table 3

Edmonton Home Care Program:
Number of Clients Per Month Requiring Chronic Wound Care

	N	Mean	SD	Median	Range
Melchior-MacDougall Study Participants (1993)	59	2.29*	2.09	2.0	0-10
Melchior-MacDougall Study Non Participants	43	6.05*	8.25	3.0	0-45
Total EHCP Participants	102	3.87	5.85	2.0	0-45

*t=2.92, df=45.93, p=.005

In addition to reporting the overall frequency of use of the CWMDT, study participants reported how many times they physically used the CWMDT and how frequently they mentally used the CWMDT (Table 4). Physical and mental use of the CWMDT were reported more frequently by Melchior-MacDougall study non participants, who, as previously noted, had also reported seeing more clients per month. Moreover, the number of clients treated with chronic wounds correlated with overall reported use of the CWMDT (r=.306, p=.003) and with reported mental use (r=.603, p=.000). In addition, overall reported use of the CWMDT correlated with reported physical use (r=.346, p=.001) and mental use of the

CWMDT (r=.488, p=.002). Eighty percent (n=73) of the total Edmonton Home Care Program participants reporting on use of the CWMDT stated it was used five or fewer times in the past month.

Table 4

Edmonton Home Care Program:
Use of the Chronic Wound Management Decision Tree

	N	Mean	SD	Median	Range
Overall Frequency of CWMDT Use (per month)					
Melchior-MacDougall Study Participants (1993)	51	3.63*	4.89	2.0	0-25
Melchior-MacDougall Study Non Participants	40	3.68*	3.90	2.5	0-15
Total EHCP Participants	91	3.65	4.46	2.0	0-25
*t=-0.5, df=89, p=.960					
Physically Used CWMDT (per month)					
Melchior-MacDougall Study Participants (1993)	52	.85*	1.13	0	0-4
Melchior-MacDougall Study Non Participants	39	1.92*	2.53	1	0-10
Total EHCP Participants	91	1.28	1.49	0	0-10
*t=1.53, df=83, p=.129					
Mentally Used CWMDT (per month)					
Melchior-MacDougall Study Participants (1993)	52	1.85*	2.38	1	0-10
Melchior-MacDougall Study Non Participants	33	2.79*	3.28	2	0-15
Total EHCP Participants	85	2.21	2.78	1	0-15
*t=1.45, df=38, p=.155					

When asked if using the CWMDT helped select the best product for treatment of chronic wounds, 89% (83/93) of the total Edmonton Home Care Program participants replied in the affirmative. Reasons cited included that the CWMDT provided guidelines and parameters for treatment (n=46), identified the most suitable product options (n=38), standardized treatment across practitioners (n=12), provided a useful reference and refresher at times when a client with a chronic wound had not been seen recently (n=9), and provided a research base for clinical decisions (n=6). Respondents also identified that the use of the CWMDT increased their confidence in product decisions (n=2). They also noted that the CWMDT was not a stand alone tool but also required a knowledge base (n=2). Concerns expressed by respondents were related to recognition of the uniqueness of each wound (n=1), physician disagreement with the treatment choice (n=1), and a need for brand versus generic names on the tool itself (n=2).

Perceived value of the CWMDT in clinical practice was also determined by asking participants if they would recommend implementation of the CWMDT by other agencies or facilities. Ninety-two percent (n=81/88) of those responding stated that this CWMDT should be implemented in other health care agencies. Reasons cited included standardization and consistency of care (n=52), ease of use and efficacy (n=28), and promotion of continuity of care (n=2). Other benefits identified were increased credibility and confidence in treatment decisions (n=3) and cost effectiveness (n=2). Hospitals, long term care facilities, and other home care agencies were identified as targets for implementation. Barriers to implementation identified were availability of products and mandatory use of the CWMDT, rather than use at the nurse's discretion.

Factors Affecting Use of the CWMDT in Clinical Practice

Subjects were asked what factors affected their decisions to use and/or not use the CWMDT in clinical practice. Edmonton Home Care Program participants stated that the CWMDT was most useful in conditions of uncertainty; for example, a new wound (n=24), a wound that was not healing (n=28), or complex wounds involving tissue destruction, eschar, drainage, and presence of additional factors impeding wound healing (n=38). Peer support was identified as a useful adjunct in conditions of uncertainty (n=4). Study subjects also reported using the CWMDT to provide information to others, such as clients (n=3) and physicians (n=3).

The major factors influencing respondents' decision to use the CWMDT were either client or nurse focused. One client focused reason was complexity of the wound (n=68), with increased complexity leading to increased use of the tool. Other client focused reasons prompting use of the CWMDT included failure of initial treatment thus requiring selection of alternatives (n=28), chronic wound versus acute wound (n=11), and enhancement of continuity of care (n=9). Nurse focused reasons for use of the CWMDT included support for decision making as assessment and treatment were planned (n=39), clear product choices (n=12), and accessability of the tool (n=8). Respondents also identified that the CWMDT provided support for autonomous and research based practice (n=4). In addition, subjects reported using the CWMDT as a teaching tool (n=5). Perception of use of the CWMDT as mandatory or policy (n=7) was also a factor promoting CWMDT use.

When asked what influenced a decision not to use the CWMDT, 26 subjects had no response and 19 stated they always use the tool, although at times only mentally. Reasons cited for non use of the CWMDT included the type of wound,

that is the CWMDT was not used with simple or acute wounds (n=27); nurse knowledge and familiarity with the CWMDT (n=8); when effective treatment was already established (n=7); the presence of a physician order (n=9); or client refusal (n=7). Peer support was identified as an alternative to use of the CWMDT, particularly when treatment choices had been tried and had failed. In addition, lack of time to use the CWMDT (n=4) and lack of availability of the tool (n=2) were also cited as reasons for nonuse.

Edmonton Home Care Program participants were also asked to identify other resources used for decision making support. Additional resources used by nurses when making chronic wound care decisions included those available internally as well as external resources. Peers (n=81) were the most frequently cited internal resource used, followed by clinical nursing specialists (Nursing Clinicals) (n=40). Twenty-two respondents referred to education materials such as articles, books, or inservice handouts. Seven respondents used vendor representatives and specific product information provided by these vendors. In addition, nine respondents consulted with physicians and twelve relied on their own experience with chronic wounds as resources.

Suggestions for improvement of the CWMDT related to both format and content. Suggestions for improving format included decreasing the number of pages (n=16) and printing the tree on a small plasticized card (n=14), or on the back of the documentation flow sheet (n=1). Content suggestions included adding brand names (n=12) and providing suggestions for combinations of products (n=3). Four respondents identified the need for additional inservices. Twenty-nine respondents stated that they had no suggestions for improvement of the CWMDT.

Accuracy of Wound Staging and Product Choice

To determine accuracy of chronic wound staging and treatment choice two years post implementation of the CWMDT by Edmonton Home Care Program nurses, three pictorial case studies were completed by all subjects. Accuracy scores for each subject were calculated by totalling the number of correct answers for the staging and product choice for each of the three case studies, thus the potential range of scores was zero (no answers correct) to six (all answers correct). The mean (N=104) for total correct scores was 4.118 (SD 1.037). There was no statistically significant difference between Melchior-MacDougall (1993) study participants and Melchior-MacDougall study non participants on accuracy of chronic wound staging and treatment choice (Table 5).

The percentages of total correct scores for the total Edmonton Home Care Program participants as well as the percentage for those who participated in the Melchior-MacDougall (1993) study (n=61) and Melchior-MacDougall study non participants (n=43) are also depicted in Table 5. Seventy-two percent (n=75) of the total Edmonton Home Care Program subjects had four or better correct answers; seven percent (n=7) of all respondents had two or less correct responses. Seventy-one percent (n=43) of Melchior-MacDougall study participants, had four or greater total correct scores; 75% (n=32) of Melchior-MacDougall study non participants scores were in this range. Ten percent (n=6) of Melchior-MacDougall study participants had two or less answers correct and two percent (n=1) of Melchior-MacDougall study non participants were in this category.

Table 5

Edmonton Home Care Program:
Total Accuracy Scores for Staging and Product Choice

	N	Mean	SD	Median	Range
Melchior-MacDougall Study Participants (1993)	59	4.10*	1.13	4	1-6
Melchior-MacDougall Study Non Participants	43	4.14*	.92	4	2-6
Total EHCP Participants	102	4.12	1.04	4	1-6

*t =.18, df=100, p=.857

	Total Number of Correct Responses					
	1	2	3	4	5	6
Melchior-MacDougall Study Participants (1993) (n=61)	1.6% (n=1)	8.2% (n=5)	19.7% (n=12)	32.8% (n=20)	29.5% (n=18)	8.2% (n=5)
Melchior-MacDougall Study Non Participants (n=43)	- (n=0)	2.3% (n=1)	23.3% (n=10)	37.2% (n=16)	32.6% (n=14)	4.7% (n=2)
Total EHCP Participants (N=104)	1.0% (n=1)	5.7% (n=6)	21.1% (N=22)	34.6% (n=36)	30.7% (n=32)	6.7% (n=7)

The percentage of correct answers for assessment and product choices for each case study are provided in Table 6. Product choice accuracy exceeded staging accuracy for Case Studies 1 and 3, while staging accuracy exceeded product choice accuracy for Case Study 2 for the total Edmonton Home Care Program participants. Staging accuracy exceeded product choice accuracy for Case Studies 2 and 3 for Melchior-MacDougall study non participants. Staging accuracy exceeded product choice accuracy for Case Study 2 for Melchior-MacDougall (1993) study participants.

Table 6

Edmonton Home Care Program:
Percentage of Correct Responses by Case Study

	Case Study 1		Case Study 2		Case Study 3	
	Staging	Product	Staging	Product	Staging	Product
Melchior-MacDougall Study Participants (1993) (n=61)	57.4% (n=35)	93.4% (n=37)	98.4% (n=60)	57.4% (n=35)	31.1% (n=19)	69.5% (n=41)
Melchior-MacDougall Study Non Participants (n=43)	65.1% (n=28)	97.7% (n=42)	100% (n=41)	83.7% (n=36)	37.2% (n=16)	30.2% (n=13)
Total EHCP Participants (N=104)	60.6% (n=63)	95.2% (n=99)	99.0% (n=103)	68.3% (n=71)	33.7% (n=35)	52.9% (n=54)

To determine if there had been a change in the accuracy of decision making, the accuracy scores of subjects who participated in the experimental group (n=47) of Melchior-MacDougall's (1993) study were compared with the accuracy scores of the 61 subjects who also participated in this study (Table 7). Most significant was the difference in the mean for total correct scores. The mean for total correct scores was 3.1 (SD=1.3) in 1993 and has increased to 4.118 (SD=1.04) in 1995 (Table 7). T-test comparison of these means was statistically significant (t=5.26, df=146, p<.001).

Table 7

Edmonton Home Care Program:
Total Accuracy of Wound Staging and Product Choice

	N	Mean	SD	Range
1993	47	3.10*	1.30	1-5
1995	61	4.12*	1.04	1-6

*t=5.26, df=146, p<.001

As it was not possible to match each subject's score from Melchior-MacDougall's (1993) study with their scores in this study, comparisons of the percentage correct for staging (Table 8) and product choice (Table 9) for each case study are presented. There is a trend to more accurate decision making in both staging and product choice from the time of introduction of the CWMDT in 1993 to the testing of accuracy of decision making in chronic wound care in 1995. Overall, staging accuracy increased by 25%, from 37% accuracy in 1993 to 62% in 1995. Product choice accuracy increased by 21%, from 52% in 1993 to 73% in 1995. The greatest change in accuracy of staging was found with Case Study 2, while the greatest change in accuracy of product choice was found with Case Study 1.

Table 8

Edmonton Home Care Program: Wound Staging Accuracy - 1993 and 1995

	Melchior-MacDougall Participants 1993 (N=94)	Melchior-MacDougall Participants 1995 (n=61)	Variance
Case Study 1	48.9%	57.4%	+8.5%
Case Study 2	52.1%	98.4%	+46.3%
Case Study 3	10.6%	31.1%	+20.5%
Total	37.23%	62.30%	+25.07%

Table 9

Edmonton Home Care Program: Product Choice Accuracy - 1993 and 1995

	Melchior-MacDougall Participants 1993 (N=94)	Melchior-MacDougall Participants 1995 (n=61)	Variance
Case Study 1	55.3%	93.4%	+38.1%
Case Study 2	42.6%	57.4%	+14.8%
Case Study 3	57.5%	69.5%	+12.0%
Total	51.77%	73.48%	+21.71%

Factors Affecting Accuracy of Nurses' Decisions

Accuracy of decision making, defined as total correct answers, was statistically analyzed to determine if there was any correlation with years of experience in home care nursing and nursing in general, level of education, number of wound care inservices attended in the past two years, number of wounds cared for per month, and age. Accuracy of decision making was not found to correlate with any of these factors (Table 10). Review of each individual case study however, did reveal a statistically significant correlation between accuracy of product choice and confidence with that choice for Case Study 2 (r=.282, p=.004) and Case Study 3 (r=.234, p=.018).

Table 10

Edmonton Home Care Program: Correlation Between Accuracy of Decision Making and Factors Potentially Affecting Accuracy for the Total Edmonton Group

	Age	Education	Experience in Nursing
Accuracy	r=.023 (p=.825)	r=.155 (p=.121)	r=.008 (p=.940)

	Experience in Home Care	Hours of Work	Inservices
Accuracy	r=.029 (p=.793)	r= -.105 (p=.297)	r=.049 (p=.623)

	Number of Clients	Use of CWMDT	Physical Use CWMDT	Mental Use CWMDT
Accuracy	r=.117 (p=.242)	r=.107 (p=.312)	r=.108 (p=.311)	r=.204 (p=.061)

Calgary Health Services

Sample Description

A total of 59 nurses employed by Calgary Health Services (CHS) participated in this study. Thirty-one participants were randomly assigned to Calgary Group A (with CWMDT) and 28 to Calgary Group B (no CWMDT). Overall, there were no statistically significant differences between the groups on any characteristics including age, years of experience in nursing or home care nursing, hours of work, number of wounds cared for each week, and chronic wound care inservices attended. The two groups were also not statistically significantly different on type of nursing education. Sample characteristics are presented in Tables 11 and 12.

The age range of the participants was 27 to 60 years (M=41.93, SD=8.439), with 58% (n=34) being older than 40 years of age. While 61% (n=36) of the nurses had 16 or more years experience in nursing, five or less of those years were in home care nursing for 64% (n=38) of the subjects. Eighty-one percent (n=48) of the nurses worked full time for Calgary Health Services. The majority of nurses had attended two (44%, n=26) or three (22%, n=13) inservices in the past two years (Table 11). The majority of Calgary Health Services home care nurses who participated in the study were prepared at a diploma level (57.6%, n=34) and the remainder (42.4%, n=25) were prepared at the baccalaureate level in nursing (Table 12).

Table 11

Calgary Health Services: Subject Characteristics

	N	Mean	SD	Median	Range
Age (years)					
Calgary Group A	29	40.62*	8.52	41	27-58
Calgary Group B	26	43.39*	8.27	44	27-60
Combined Group	55	41.93	8.44	42	27-60
*t=1.22, df=53, p=.229					
Experience in Nursing (years)					
Calgary Group A	31	16.10*	7.10	18	6-27
Calgary Group B	28	18.57*	7.30	19	5-30
Combined Group	59	17.27	7.24	18	5-30
*t=1.32, df=57, p=.192					
Experience in Home Care (years)					
Calgary Group A	31	5.29*	4.41	4	2-25
Calgary Group B	28	6.21*	4.89	5	1-22
Combined Group	59	5.73	4.63	4	1-25
*t=.76, df=57, p=.448					
Hours of Work (per week)					
Calgary Group A	31	35.58*	7.13	38	17-48
Calgary Group B	28	33.57*	10.31	38	0-45
Combined Groups	59	34.63	8.77	38	0-48
*t=.86, df=47, p=.393					

Table Continues ...

Table 11 - Calgary Health Services: Subject Characteristics - cont'd

	N	Mean	SD	Median	Range
Number of Wound Care Inservices Attended (1993-1995)					
Calgary Group A	31	2.19*	1.05	2	0-5
Calgary Group B	28	1.96*	0.84	2	1-4
Combined Group	59	2.09	0.95	2	0-5

*t=-.92, df=57, p=.360

Table 12

Calgary Health Services: Subjects Nursing Education

	N	RN	BScN
Calgary Group A	31	54.8%*	45.2%*
Calgary Group B	28	60.7%*	39.3%*
Combined Group	59	57.6%	42.4%

*Chi-square=.208, df=1, p=.648

Most nurses had seen one (36%, n=21) or two (32%, n=19) clients requiring chronic wound care in the month preceding the study (Table 13). The range for number of clients seen with chronic wounds was 0 - 6 for Calgary Group A and 0 - 25 for Calgary Group B.

Table 13

Calgary Health Services: Number of Clients Per Month Requiring Chronic Wound Care

	N	Mean	SD	Median	Range
Calgary Group A	31	2.07*	1.5	2	0-6
Calgary Group B	28	3.18*	5.6	2	0-25
Combined Group	59	2.09	.95	2	0-25

*t=1.07, df=57, p=.287

Accuracy of Wound Staging and Product Choice

To determine if the use of a CWMDT increased the accuracy of decision making by Calgary Health Services home care nurses in the staging and subsequent product choice for chronic wounds, subjects were randomly assigned to an experimental group that had a copy of the CWMDT to assist in decision making (Calgary Group A), or a control group who had no decision support tool (Calgary Group B). Calgary Group A's and Calgary Group B's overall accuracy scores were compared using a t-test ($p<.05$).

Accuracy of wound staging is presented separately for each pictorial case study in Table 14. For Case Studies 1 and 2, there were more nurses in Calgary Group A (n=21 and n= 22, respectively) who correctly staged the wound than in Calgary Group B (n=15 and n=15, respectively). For Case Study 3, three nurses in Group B and one in Group A correctly staged the wound. The overall accuracy rates for staging for each pictorial case study were as follows: Case Study 1 was 36/59, Case Study 2 was 37/59, and Case Study 3 was 4/59. The overall staging accuracy for Group A was 44/93 (47%), and for Group B was 33/84 (39%). The accuracy of decision making for the two groups for wound staging was not statistically significant overall, nor for any of the case studies individually.

Table 14

Calgary Health Services: Staging Accuracy Scores

	Case Study 1		Case Study 2		Case Study 3		Total
	Group A	Group B	Group A	Group B	Group A	Group B	
Accurate	21 (68%)	15 (54%)	22 (73%)	15 (54%)	1 (3%)	3 (11%)	77
Inaccurate	10 (32%)	13 (46%)	8 (27%)	13 (46%)	29 (97%)	24 (89%)	97
	31	28	30	28	30	27	174

Table Continues ...

Table 14 - Calgary Health Services: Staging Accuracy Scores - Cont'd

	Total Accuracy Scores for Staging		
	Group A	Group B	Total
Accurate	44*	33*	77
Inaccurate	47*	50*	97
	91	83	174

*Chi-square=1.30, df=1, p=.254

Product choice accuracy was assessed for each pictorial case study and is presented for Calgary Group A (with CWMDT) and Calgary Group B (no CWMDT) in Table 15. The overall accuracy for product choice was 43/59 for Case Study 1, 40/59 for Case Study 2, and 27/58 for Case Study 3. The overall product choice accuracy for Group A was 66/93 (71%), and for Group B was 44/84 (52%). For each pictorial case study, the Calgary Group A product choice accuracy was greater than Calgary Group B. This difference between Calgary Group A and Calgary Group B was statistically significant (Chi-square=7.020, df=1, p=.008). In addition, statistically significant differences between the groups were found in Case Study 1 (Chi-square=3.99, df=1, p=.046) and Case Study 3 (Chi-square=4.52, df=1, p=.034). The errors in product selection for both groups reflected a tendency to over treat chronic wounds, that is, products selected were more than were required to treat the wound. This was true for all pictorial case studies.

Table 15

Calgary Health Services: Product Choice Accuracy Scores

	Case Study 1		Case Study 2		Case Study 3		
	Group A	Group B	Group A	Group B	Group A	Group B	Totals
Accurate	26 (84%)	17 (60%)	22 (71%)	18 (64%)	18 (60%)	9 (32%)	110
Inaccurate	5 (16%)	11 (39%)	9 (29%)	10 (36%)	12 (40%)	19 (68%)	66
	31	28	31	28	30	28	176

Total Accuracy Scores for Product Choice

	Group A	Group B	Total
Accurate	66*	44*	110
Inaccurate	26*	40*	66
	92	84	176

*Chi-square=7.020, df=1, p=.008

Total accuracy scores were determined by totalling the number of accurate decisions made for staging and product choice for each subject. The potential range of correct decisions was zero to six. A statistically significant difference was found between the two groups (t=-2.55, df=45, p=.014). Nurses in Calgary Group A (with CWMDT) made more accurate decisions (M=3.62, SD=1.12) than those in Calgary Group B (no CWMDT) (M=2.67, SD=1.62).

Factors Affecting Accuracy of Nurses' Decisions

Correlations between accuracy scores and years of experience in home care nursing and nursing in general, level of education, number of wound care inservices attended in the past two years, number of wounds cared for per month, and age were done to determine if accuracy could be predicted by any of these variables. No

correlations were found (Table 16). There was also no correlation found between correct product choice and confidence in that decision for any of the three pictorial case studies: Case Study 1 (r=.069, p=.602); Case Study 2 (r=.037, p=.780); Case Study 3 (r=-.108, p=.421).

Table 16

Calgary Health Services: Correlations Between Accuracy of Decision Making and Factors Potentially Affecting Accuracy for the Combined Calgary Groups

	Age	Education	Experience in Nursing
Accuracy	r=-.089 (p=.525)	r=.029 (p= .834)	r=-.098 (p=.474)

	Experience in Home Care	Hours of Work	Inservices	Number of Clients
Accuracy	r=.231 (p=.087)	r=.047 (p=.733)	r=-.052 (p=.706)	r=-.010 (p=.939)

CHAPTER FIVE

Discussion of Findings

The purposes of this study were: (1) to assess the use of the Chronic Wound Management Decision Tree (CWMDT) over time, to assess the accuracy of decision making two years post implementation of the CWMDT with Edmonton Home Care Program nurses, and to investigate the relationship between accuracy of decision making in chronic wound care and several variables identified in the literature as potentially influencing accuracy of clinical decision making; and (2) to replicate Melchior-MacDougall's (1993) study with Calgary Health Services home care nurses, to assess accuracy of decision making with use of the CWMDT, and to investigate the relationship between accuracy of decision making in chronic wound care and other factors potentially influencing accuracy of decision making. To assess use of the CWMDT in the Edmonton Home Care Program population, a questionnaire was administered. To assess accuracy, three pictorial case studies were completed by Edmonton Home Care Program participants. Accuracy of decision making and factors influencing decision making in the Calgary Health Services population were assessed using the same questionnaire and three pictorial case studies.

Data for the Edmonton Home Care Program participants were analyzed in three groups. First, the statistical and qualitative analyses were done for data collected from those nurses who had participated in Melchior-MacDougall's (1993) study; second, statistical and qualitative analyses were done for data collected from those nurses who had not participated in Melchior-MacDougall's study and, third, statistical analyses of the quantitative data was done for the total Edmonton Home Care Program participants. Data for the Calgary Health Services participants were analyzed using t-tests or Chi-square analysis to determine differences on the study variables between Calgary Group A (with CWMDT) and Calgary Group B (no CWMDT).

Edmonton Home Care Program (EHCP)

The Edmonton Home Care Program participants (N=104) were comprised of nurses who had participated in the Melchior-MacDougall (1993) study of the effect of a decision tree on accuracy of decision making in chronic wound care (n=61) and nurses who were Melchior-MacDougall study non participants (n=43). Chronic wound care is provided to home care clients by all Edmonton Home Care Program nurses, although the number of clients with chronic wounds may vary for each case load. The two groups of participants were statistically significantly different in age, experience in nursing, experience in home care and the number of clients with chronic wounds. The nurses who were Melchior-MacDougall study non participants were younger, had less experience in nursing and in home care nursing; however, they cared for more clients with chronic wounds. Twenty-eight percent of Melchior-MacDougall study non participants, versus two percent of Melchior-MacDougall study participants, saw 10 or more clients with chronic wounds per month. Examination of the hiring and staffing practices of the Edmonton Home Care Program provides some explanation for this variation. First, Melchior-MacDougall study non participants were primarily staff hired by the Edmonton Home Care Program since 1993. As position vacancies in the past two years have predominately been on the evening and weekend rotations, and as the need for increased nursing staff on these shifts has been precipitated by the shifting of care from an acute care institution to community setting, nurses with recent hospital experience have been hired by the EHCP. The majority of these individuals are recent nursing graduates, as recent graduates are the largest group impacted by hospital staff reductions in the Edmonton region. Second, chronic wounds that are complex, or not healing as expected, may require nursing visits more than once per day, therefore evening and weekend staff also see these clients. As evening and weekend nurses

provide visits to clients in a larger geographical area than day nurses, they often see the clients of more than one day shift nurse.

Use of the CWMDT in Clinical Practice

The Chronic Wound Management Decision Tree was found to be used by Edmonton Home Care Program participants to assist with decision making for complex chronic wounds. The reported use, mental and physical, of the CWMDT and the reported number of clients with chronic wounds treated by EHCP participants were positively correlated. That is, a positive relationship existed between the number of clients with chronic wounds and the number of times EHCP nurses reported using the CWMDT ($r=.306$, $p=.003$). In addition to reporting frequency of both clients with chronic wounds and CWMDT use, EHCP participants stated that the CWMDT helped select the best product for treatment, assisted with decision making in conditions of uncertainty, increased their confidence in decisions made, and was of greatest value with chronic wounds they described as complex. The respondents also felt standardization and consistency of care had been enhanced and would be further enhanced if the CWMDT were implemented by other agencies. Overall, the CWMDT was perceived to be of value and its use, either physical or mental, was reported by EHCP participants. The advantages of the CWMDT identified by Edmonton Home Care Program participants mirrored those reported in the literature; that is, increased accuracy of decisions (Burns et al., 1994; Gamble & Hamilton, 1995; Mantel, 1992; Melchior-MacDougall, 1993; Van den Berg & Visinski, 1992; Willey, 1990), standardization of treatment and consistency of care among caregivers (King, 1991; Lanza & Bantly, 1991), research base to practice (Burns et al., 1994; Dean-Barr, 1993; Tanner, 1989), and increased confidence in decisions made (Wurzback, 1991).

Factors identified by EHCP participants as influencing their decision to use the

CWMDT were client and nurse focused. The participants identified factors such as type and complexity of the wound and efficacy of current treatment as the primary client factors affecting their decision to use the CWMDT. This is consistent with information in the literature that indicates that decision support tools are of most value in complex clinical situations (Gamble & Hamilton, 1995; Grier, 1976; Shewchuk & Francis, 1988). In addition, support for decision making, particularly for product selection, was the major nurse focused reason for use of the CWMDT. Reasons for non use of the decision tree were the opposite of those for using the tool; that is, when the wound was simple and the treatment effective, the tool was not consulted.

Accuracy of Decision Making

The results of this study indicate that the accuracy of decision making has increased two years post implementation of the CWMDT. The mean for total correct scores for the three pictorial case studies increased from 2.7 (SD=1.3) in 1993 to 4.12 (SD=1.04) in 1995. Differences in mean total correct scores of Melchior-MacDougall study participants in 1993 and 1995 were found to be statistically significant ($t=10.90$, $df=62$, $p<.001$). The CWMDT has therefore assisted in increasing accuracy of decision making for chronic wound care in this group of nurses. As introduction of the CWMDT was accompanied by inservices and expert clinical support and, as decision support tools require a knowledge base for application, it is presumed that this education also contributed to the identified increase in accuracy. However, as no correlation between accuracy and number of inservices attended was found, the CWMDT is also likely a factor contributing to increased accuracy of decision making.

Other factors could account for the change in accuracy. First, the increased scores could also have been the result of a difference in participants between 1993 and 1995, such as the poor performers in Melchior-MacDougall's 1993 study no longer being

employed by EHCP. As test scores could not be matched, this could not be determined directly. However, examination of the subject's characteristics only revealed the expected increase in experience in nursing (1993 M=15.5, SD=8.7; 1995 M=16.7, SD=7.5) and home care nursing (1993 M=5.6, SD=4.4; 1995 M=6.4, SD=3.6). Furthermore, nursing education for both groups was similar with 13% prepared at the RN level in 1993 and 15% had RN preparation in 1995. Seventy-six percent were prepared at the baccauleauate level in 1993 and 82% were bacculeaurate prepared in 1995. The number of clients with chronic wounds cared for per month was also similar. The mean number of clients seen in 1993 was 1.7 (SD=1.7), while the mean in 1995 was 2.2 (SD=2.0). Secondly, it is possible that subjects could have remembered the pictorial case study answers from the first study, although correct answers were never discussed or published.

In addition to an overall increase in accuracy of decision making, accuracy for both staging and product choice for each pictorial case study has also increased since Melchior-MacDougall's (1993) study. Overall, staging accuracy increased from 37% in 1993 to 62% in 1995, and product choice accuracy increased from 52% in 1993 to 73% in 1995. As nurses in this study did not have physical access to the CWMDT during completion of the pictorial case studies, this increase in accuracy provides evidence of integration of chronic wound care knowledge and an ability to apply that knowledge, at least in a simulated setting.

Although accuracy of decision making for both wound staging and product choice has improved, it is still not 100%. Although this may be partially accounted for by decision making in a simulated situation, with limited information about the client and the wound status, further investigation of additional reasons for this discrepancy is required. The CWMDT's reliability and ineffective dissemination of changes in the tool may be two

additional factors impacting accuracy. Although content validity has been established for the CWMDT, inter and intra user reliability has not been tested. As the CWMDT was constructed so accurate wound staging provided direction for product choice, it is possible that construction of the tool may be impacting accuracy of decision making. Similarity of product choices among wound care stages may also account for accuracy discrepancies. In Case Studies 1 and 3, product choice accuracy exceeded staging accuracy. Case Study 1 tended to be over staged, however, the treatment choices for Stage 1 and Stage 2 wounds was similar, therefore this may account for accuracy of product choice exceeding accuracy of wound staging. For Case Study 3, the error in staging was that the wound can not be staged as it was covered with non-viable tissue. However, the product choices made indicate the nurses recognized the need to remove the non-viable tissue.

Overall, introduction of CWMDT, in conjunction with sessions designed to increase the nurses knowledge base regarding chronic wound assessment and management, has had the desired effect of increasing accuracy of decision making. Whether this translates into improved client outcomes and more effective use of resources requires further investigation.

Factors Affecting Accuracy of Nurses' Decisions

Investigation of additional factors identified during the literature review as potentially influencing the accuracy of decision making found no correlation between age, experience in nursing or home care nursing, education, number of wound care inservices attended, or number of chronic wounds cared for, and accuracy of decision making. It may be that the CWMDT equalized the impact of other factors by providing easily accessible and accurate information as a basis for decision making. Other factors that may account for not finding a correlation include: the sample size may be too small, the

group may be homogenous on the factors tested, or the use of a simulated situation.

Nurses in the Edmonton Home Care Program described the CWMDT as most beneficial as a decision support tool in conditions of complexity and uncertainty. Case Studies 2 and 3 depicted complex wounds and confidence in product choice and accuracy of decisions made were positively correlated for these pictorial case studies. Thus, as the accuracy of decision making was not correlated with other study variables, and as confidence in decisions made in complex situations was correlated with accuracy of product choice, provision of decision trees for use by home care nurses in complex clinical decision making situations is supported.

Calgary Health Services

Fifty-nine Calgary Health Services home care nurses participated in this replication of Melchior-MacDougall's (1993) study, 31 in Calgary Group A (with CWMDT) and 28 in Calgary Group B (no CWMDT). No differences between the two groups were found on any of the sample characteristics. The nurses ranged in age from 27 to 60 years, had 5 to 30 years nursing experience, and 1 to 30 years of home care nursing experience. The majority of the nurses worked full time and had attended zero to five wound care inservices in the past two years.

Accuracy of Decision Making

The findings of this study were similar to Melchior-MacDougall's (1993) findings, in that accuracy of decision making for chronic wound care was statistically significantly different between nurses who had the CWMDT to assist with decision making and those who did not ($t=-2.55$, $df=45$, $p=.014$). Nurses with access to the CWMDT (Calgary Group A) made more accurate staging and product choice decisions.

Calgary Group A accurately staged the wounds 57% of the time, while Calgary Group B was accurate 43% of the time. Calgary Group A's accuracy exceeded Calgary

Group B's for Case Studies 1 and 2. Although Calgary Group B's accuracy exceeded Calgary Group A's in staging of the wound in Case Study 3 [3% (n=1) accurate for Calgary Group A; 11% (n=3) accurate for Calgary Group B], the error rate for wound staging for both groups exceeded 85%. These findings are comparable to those of Melchior-MacDougall's (1993), who found 60% of the nurses in the group with the CWMDT accurately staged wounds, whereas only 40% of nurses in the group without the CWMDT made accurate wound staging decisions. As in the Calgary population, the staging accuracy for Melchior-MacDougall's group with the CWMDT exceeded staging accuracy for the group without the CWMDT for Case Studies 1 and 2. Study findings were also similar for Case Study 3 where 15% (n=7) of subjects without the CWMDT accurately staged the wound versus 6% (n=3) for participants with the CWMDT. In addition, the error rate for both groups exceeded 85%. The error in Case Study 3 for Melchior-MacDougall's (1993) study was the same as for Calgary Group A and Calgary Group B; the nurses attempted to stage the wound when it was inappropriate to do so, as the wound was partially covered by non-viable tissue. This is most likely attributable to a lack of knowledge about wound staging. All Melchior-MacDougall study participants as well as all Calgary Health Services participants staged the Case Study 3 wound as Stage 3 or 4.

Product choice accuracy was 60% for Calgary Group A and 40% for Calgary Group B. Calgary Group A's accuracy scores exceeded Calgary Group B's for product choice for each of the three pictorial case studies. Melchior-MacDougall's (1993) findings were similar, as 55% of the group with the CWMDT accurately selected the correct products for treatment of the chronic wounds and 45% of the group without the CWMDT accurately selected the correct products. In Melchior-MacDougall's study, the accuracy of the group with the CWMDT exceeded that of the group without the CWMDT for Case Studies 1 and 2. However, the two studies differed in that the accuracy of product choice

for the group without the CWMDT exceeded accuracy of the group with the CWMDT for Case Study 3 (55% vs 60%).

Factors Affecting Accuracy of Nurses' Decisions

No correlation between age, experience in nursing or home care nursing, education, number of wound care inservices attended, number of wounds cared for, confidence in decisions made, and accuracy of decision making were found with the Calgary Health Services participants. This may be due, in part, to the small sample size with further investigation being warranted.

Limitations of the Study

There were several limitations in this study. First, with the Edmonton Home Care Program participants, the three pictorial case studies were the same as those used in Melchior-MacDougall's (1993) study, therefore the potential for memory of the pictorial case studies existed. As the pictorial case studies and their correct answers were never discussed with study participants, and as this study was conducted two years later, the effect of memory was judged to be minimal. Secondly, the accuracy of decision making in actual clinical situations versus simulated case studies may be different. In a clinical situation, the nurse has the opportunity to gather additional data to assist in decision making. Third, self-reported use of the CWMDT may not have accurately captured actual use, as the self-report relied only on the participant's ability to recall visits for the past month. No access to case load statistics was permitted, thus the potential for over or under estimating actual number of clients seen existed. Fourth, to accommodate each team's schedule, the study was repeated at three separate times in Edmonton and five separate times in Calgary. In Edmonton, the study was conducted on one afternoon and in Calgary the study was conducted over two days. Although the teams were not in the same physical space at the same time during the study, there was the potential for

discussion of the study among participants at the three Edmonton locations and also among the five Calgary Health Services home care teams. Finally, the potential for different groups receiving different instructions also existed. This was controlled by having only one individual give identical instructions to all the groups.

Implications of the Study

Findings from this study indicate that use of the Chronic Wound Management Decision Tree as a decision support tool in chronic wound care increases the accuracy of decision making, thus, one could predict a positive impact on client outcomes and cost effective utilization of human and material resources. First, accuracy of decision making in the assessment and staging phase of wound care ensures underlying conditions that may impact wound healing are identified and addressed. Treatment of underlying conditions accelerates wound healing thereby decreasing human and material costs. Second, choosing the correct product to treat a wound may decrease costs. The wound healing process is supported thus, the wound will heal in the least amount of time, thereby minimizing nursing visits and amount of materials required. Nursing time may also be decreased as many of the appropriate products require less frequent dressing changes. Third, the decision tool can be used to teach clients wound healing principles; knowledgeable clients are less likely to remove dressings unnecessarily. Fourth, as each nurse has timely and independent access to direction for chronic wound care, consultation with other wound care experts occurs only in the most complex cases. This is particularly important in community based practice where the nurse does not have immediate physical access to a wound care expert for consultation. Finally, use of a decision tree provides consistent reinforcement of learning; the nurse reviews the same information each time the decision tree is used. Thus, as CWMDT use increases, familiarity with the assessment and treatment protocols increases. Theoretically, the

CWMDT acts as a self-learning package, thereby decreasing the need for repeated inservices to reinforce learning.

Use of decision trees potentially promotes the application of research by providing research based information in a clear, concise, and user friendly format. Research based decision support that standardizes assessment and treatment protocols, increases autonomous decision making. Communication of a standard chronic wound management protocol to physicians eliminates the time consuming need to find a physician to provide or change wound management orders. The nurse independently adjusts wound care treatment based on her assessment and the CWMDT. Consultation with other disciplines occurs when the nurse identifies the need for additional support in the management of the chronic wound.

The effect of the CWMDT on accuracy of decision making should be tested with hospital based nurses as differences in the practice setting may influence decision making. In addition, testing in an actual clinical situation, ideally measuring outcomes of wound care over time, should occur. Theoretically, chronic wounds should heal faster when the correct treatment has been provided. In actual clinical settings, the factors that influence wound healing are multiple and, in community practice, not always controllable.

Pictorial case studies provide limited information about the client and do not permit collection of information about decision support tool use over time as the wound improves, remains the same, or deteriorates. Edmonton Home Care Program nurses in this study reported that when wounds do not improve, the CWMDT was supplemented by colleague or expert nurse consultation. More information about when this consultation is made, how the nurse chooses who to consult, accuracy of the guidance provided, and what information the wound care consultant uses to arrive at decisions, would provide further information about the decision making process in chronic wound care.

As the CWMDT does not lead to error free decision making, further investigation is warranted. The nurse's knowledge base and the decision tool design are two possible explanations for decision making errors. First, as more errors were made with accuracy of wound staging, it may be that additional knowledge specific to the criteria for each stage is required. For example, least accurate staging decisions, for all groups, were made for a wound covered with non-viable tissue that must be removed prior to wound staging. In addition, education linking brand and generic names may be required. The Edmonton Home Care Program participants suggested that the CWMDT would be improved by incorporating both brand and generic names, suggesting that some individuals may be more familiar with brand names. Second, the design of the decision tool may influence accuracy. Currently, the CWMDT requires four 8½ x 11 pages and requires the nurse flip pages back and forth as she completes her assessment and selects products. Finally, the CWMDT has been tested for content validity, but inter and intra user reliability has not been tested.

Conclusion

The purpose of this study was to investigate the effect a decision tree had on decision making accuracy for chronic wound care, a complex area of clinical practice. In addition, other factors that might predict accuracy of decision making for chronic wound staging and product choice were investigated. First, administration of three pictorial case studies to Edmonton Home Care Program nurses who had been using the CWMDT for two years found that accuracy of decision making had increased since its introduction. In addition, Edmonton Home Care Program nurses identified that the CWMDT supported decision making, particularly when the chronic wound being treated was complex. Second, Melchior-MacDougall's (1993) findings were replicated with Calgary Health Services home care nurses. Nurses with the CWMDT made significantly more accurate

decisions than those who did not have access to the CWMDT. Furthermore, accuracy of decision making for chronic wound care was not found to be associated with age, experience in nursing and in home care nursing, education, number of inservices, number of chronic wounds cared for each month, and confidence in decision making.

As health care reform and shrinking resources continue to challenge providers to focus on accountability and client outcomes, supports for nurses that assist in assuring appropriate and cost effective care will become imperative. Decision trees offer one mechanism for providing this support. Evidence of decision tree effectiveness in supporting accurate decision making and potentially increasing clinical expertise was supported by the findings of this study.

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Appendix A

Questionnaire (Edmonton Group)

1. Please indicate your age in years. _____

2. Education: Please indicate the level of education completed:

- ☐ Diploma in Nursing
- ☐ Basic Degree in Nursing
- ☐ Master of Nursing
- ☐ Other (please specify)

In Column 1, please fill in your answers to the questions listed in Column 2.	
Column 1	Column 2
_____ years _____ months	3. Please indicate your total number of years and months of nursing experience.
_____ years _____ months	4. Please indicate the total number of years and months of nursing experience you have in home care.
_____hours/week	5. Please indicate the average number of hours you work per week in your current position.
_____ inservices	6. How many inservices related to chronic wound care you have attended in the past two years? (Include internal and external inservices.)
_____ clients	7. In the past month, for approximately how many home care clients did you provide chronic wound care?
_____ times	8. In the same period noted in question #6, how often did you refer to the Chronic Wound Care Decision Tool (CWMDT)?
a) _____ times b) _____ times	9. Of the number you identified in question #7: a) how many time did you physically refer to the tool? b) how many times did you mentally walk through it?

10. Do you feel using the CWMDT assists you in selecting the best product for treating chronic wounds? Why or why not?

11. In what situations do you find the CWMDT most useful? Explain.

12. Please list all factors that influence your decision to use the Chronic Wound Management Decision Tree.

13. Please list all factors that influence your decision to not use the Chronic Wound Management Decision Tree.

14. Do you have any suggestions that would make the CWMDT easier to use?

15. Please list all other resources that you use when making treatment choices for chronic wounds. (eg: articles, peer consultant etc)

16. Would you recommend implementation of the CWMDT by other health care agencies? Explain.

17. Please indicate if you attended the following wound care inservices offered by the EHCP.

- ☐ January, 1993 one half day inservice held at the Glenrose Hospital Auditorium
- ☐ February, 1993 Nursing Fair
- ☐ both of the above

Questionnaire (Calgary Groups A & B)

1. Please indicate your age in years. _____

2. Education: Please indicate the level of education completed:

   ☐ Diploma in Nursing
   ☐ Basic Degree in Nursing
   ☐ Master of Nursing
   ☐ Other (please specify) _____

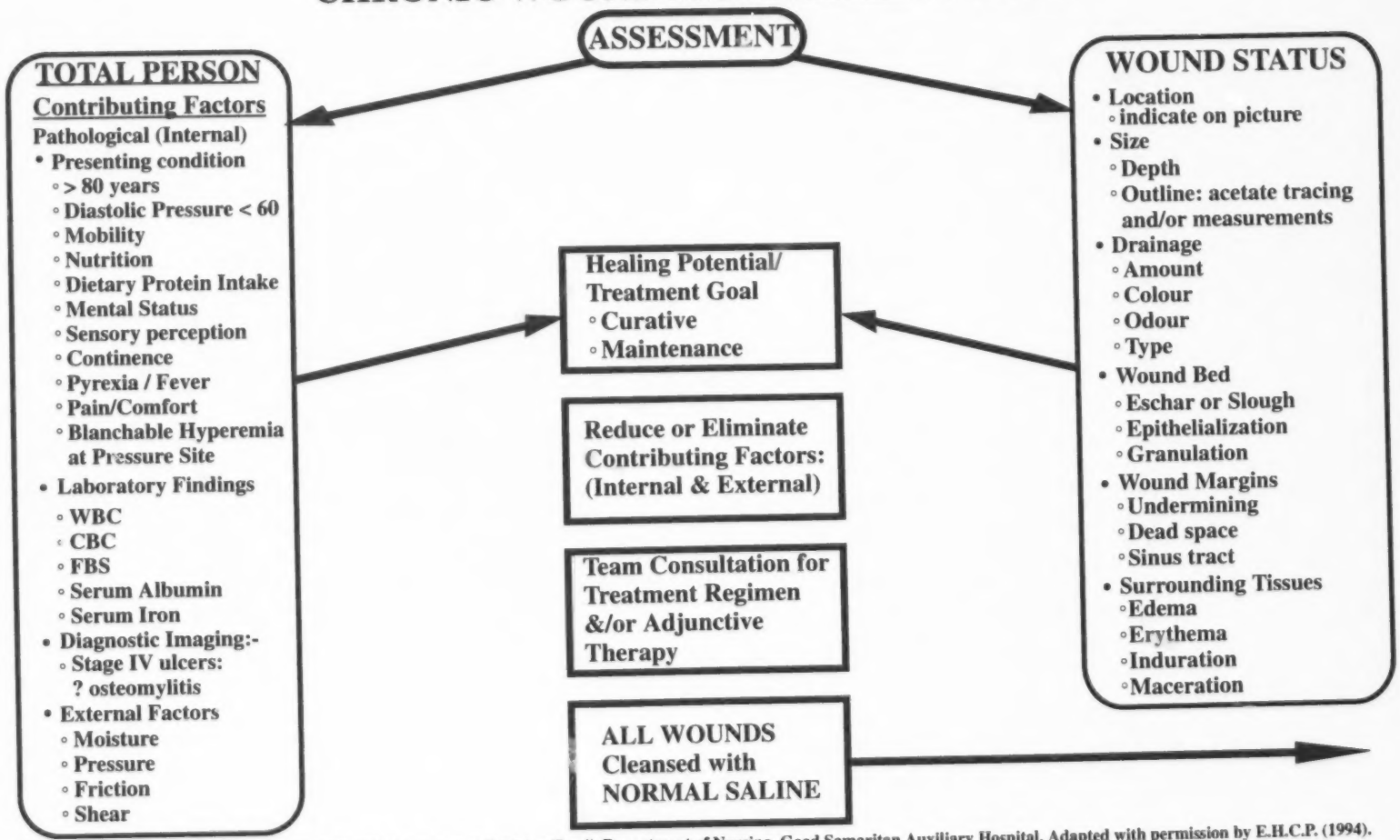
In Column 1, please fill in your answers to the questions listed in Column 2.	
Column 1	Column 2
_____ years _____ months	3. Please indicate your total number of years and months of nursing experience.
_____ years _____ months	4. Please indicate the total number of years and months of nursing experience you have in home care.
_____hours/week	5. Please indicate the average number of hours you work per week in your current position.
_____ inservices	6. How many inservices related to chronic wound care you have attended in the past two years? (Include internal and external inservices.)
_____ clients	7. In the past month, for approximately how many home care clients did you provide chronic wound care?

8. Please list all resources that you use when making treatment choices for chronic wounds. (eg: articles, product monographs, peer consultant etc)

9. What factors influence your choice of resources? Explain.

Appendix B

CHRONIC WOUND MANAGEMENT TOOL



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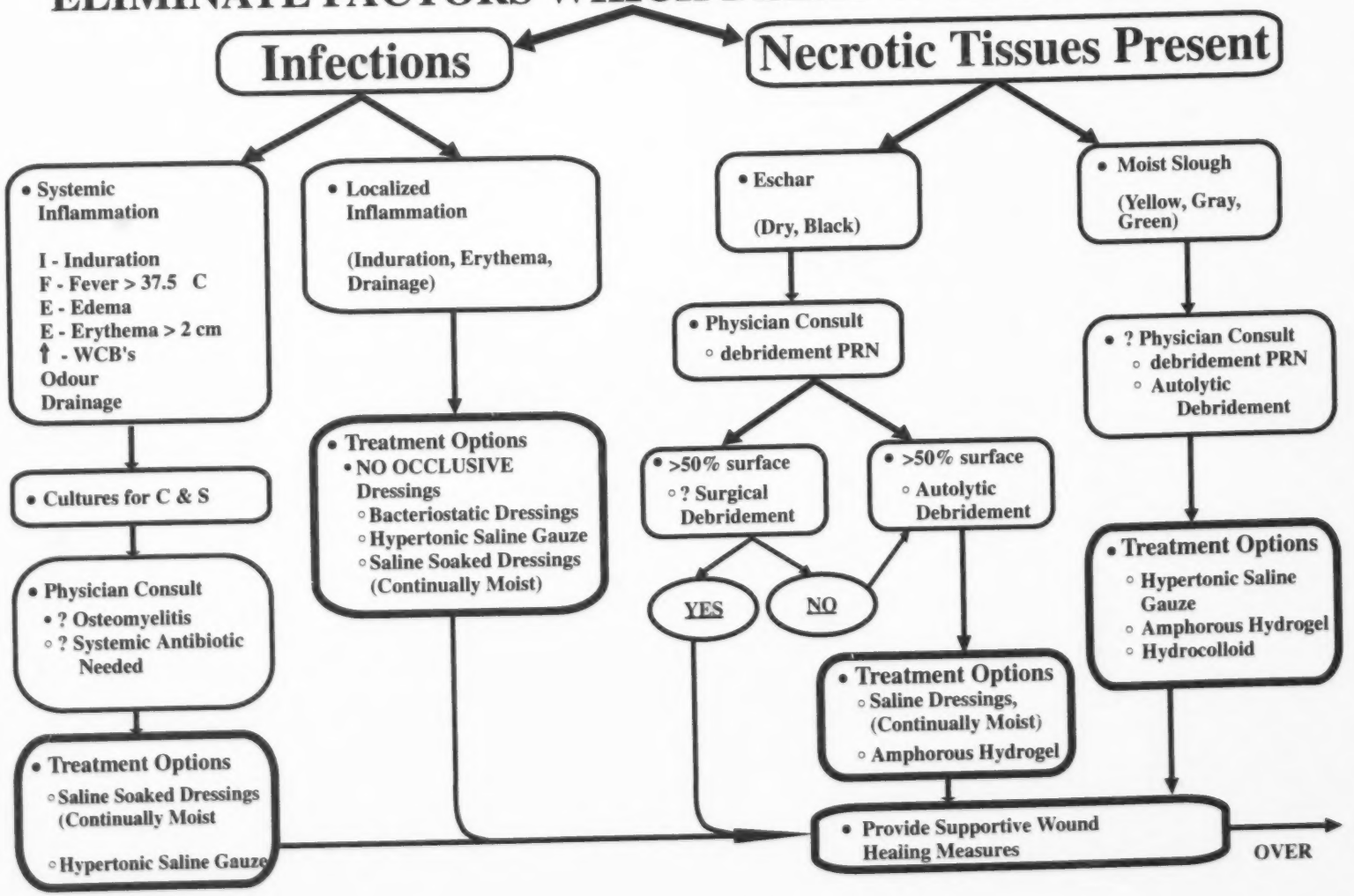
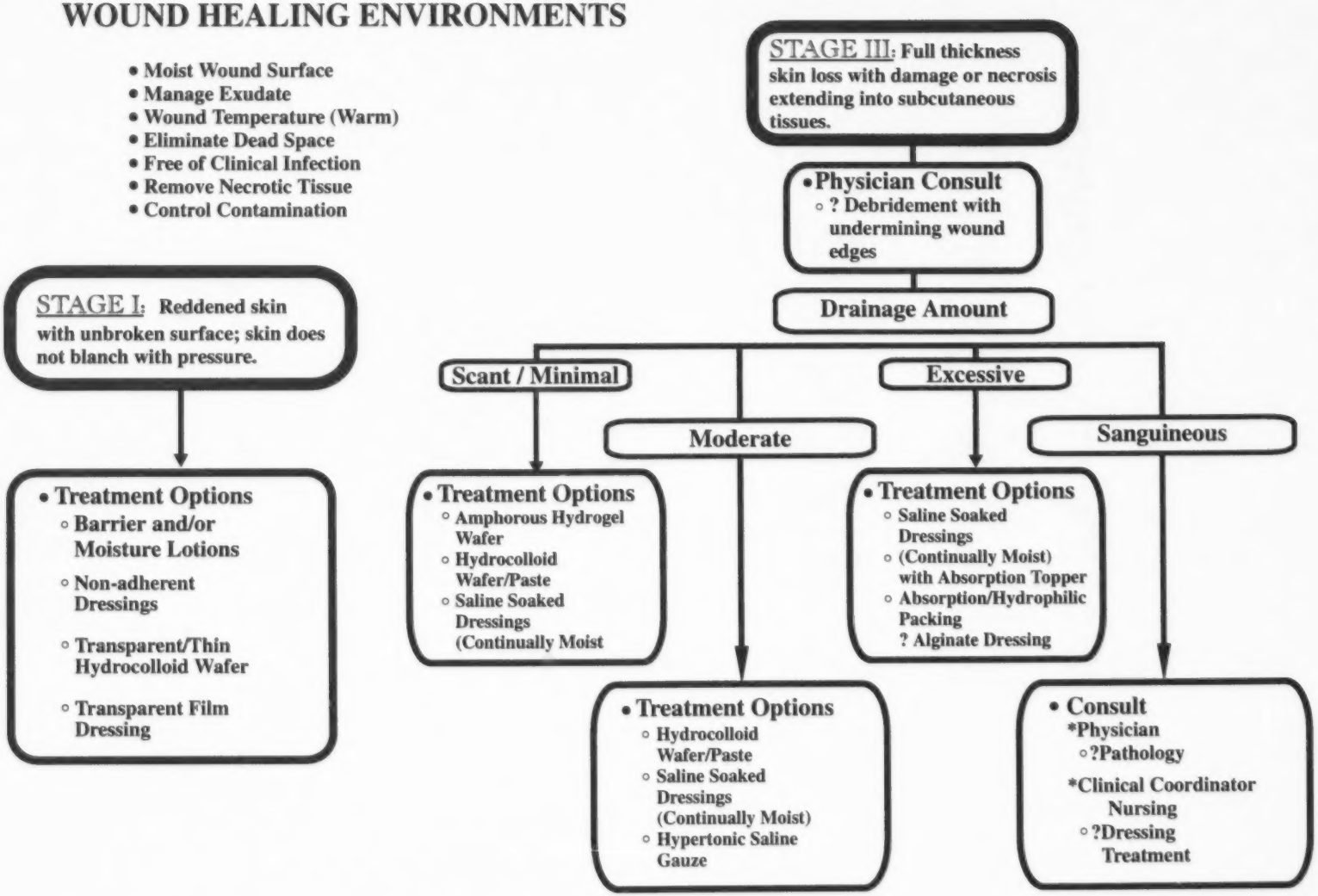
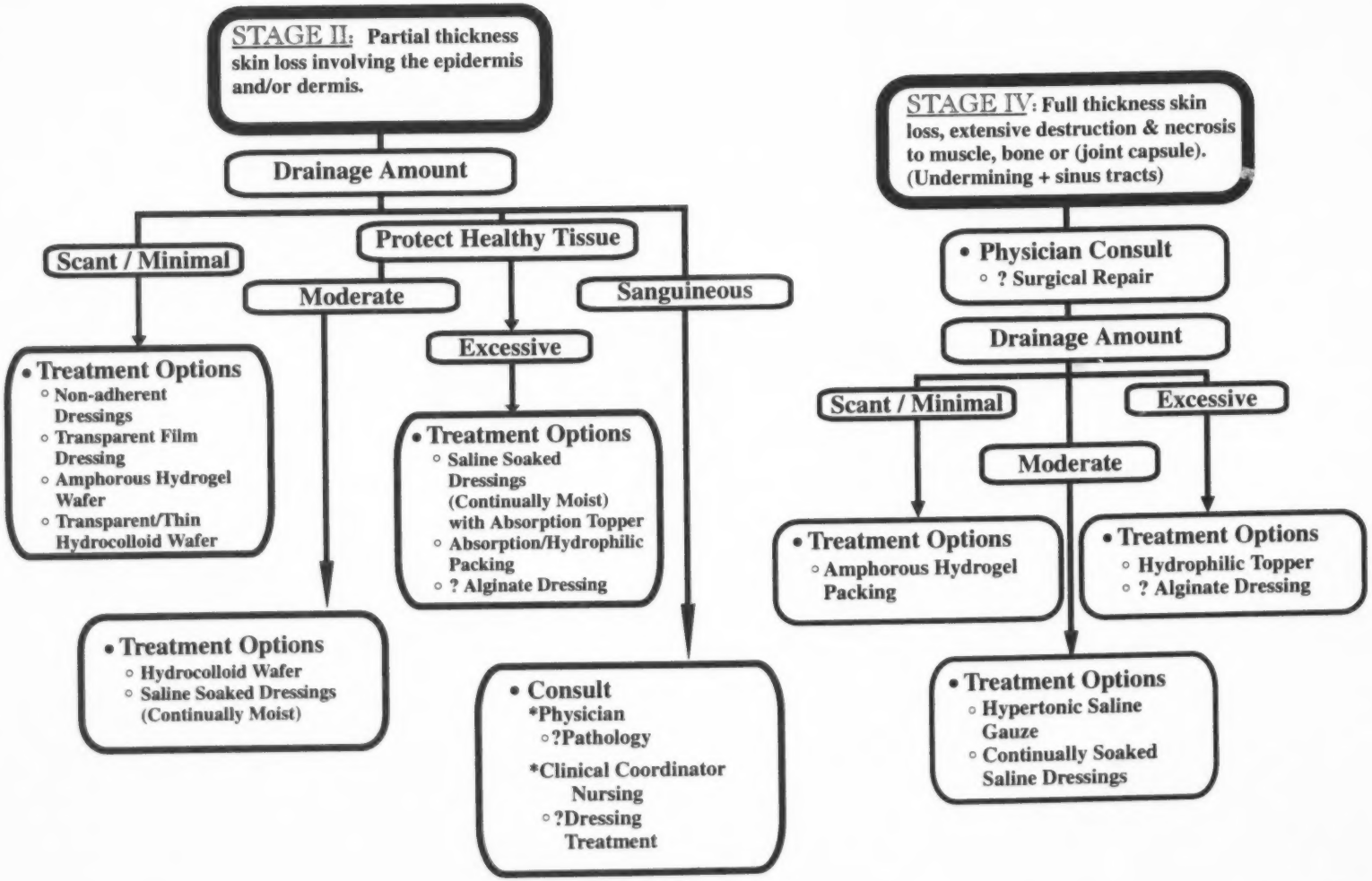
ELIMINATE FACTORS WHICH DELAY WOUND HEALING



WOUND HEALING ENVIRONMENTS

- Moist Wound Surface
- Manage Exudate
- Wound Temperature (Warm)
- Eliminate Dead Space
- Free of Clinical Infection
- Remove Necrotic Tissue
- Control Contamination





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Appendix C

Pictorial Case Studies

CASE HISTORY # 1

Patient history - 57 year old male who had coronary artery bypass surgery within the past week.

Description and location of wound - fluid filled blisters on buttocks near coccyx surrounded by mild redness, otherwise this patient's skin is intact. Reddened area with blisters measures approximately 6cm in length and 2 cm in width, shape is linear.

Photograph of wound

Pictorial Case Study Answer Sheets (Calgary Group A)

Case History #1

1. Assessment of Wound Depth

   ☐ Stage I (redness)

   ☐ Stage II (loss of superficial skin layer only)

   ☐ Stage III (tissue loss extending into subcutaneous tissue)

   ☐ Stage IV (tissue loss extending to muscle and/or bone)

   ☐ unable to determine stage of wound in present state

2. Choice of Wound Dressing

   Using the Chronic Wound Management Decision Tree as a reference, identify the specific type of dressing that would be most appropriate for promoting maximum healing in the shortest amount of time for the wound in Case History #1.

   _____

   _____

   _____

3. Confidence in the Accuracy of Your Decision

   Place an X on the graph below to represent the level of confidence you have that the choice you have made is the most appropriate wound dressing.

   0 _____ 10

   absolutely no confidence complete confidence

   (0 means you have absolutely no confidence in your choice being the most appropriate and 10 means you have complete confidence that your choice is the most appropriate)

Pictorial Case Study Answer Sheets (Edmonton Group, Calgary Group B)

Case History #1

1. Assessment of Wound Depth

   ☐ Stage I (redness)

   ☐ Stage II (loss of superficial skin layer only)

   ☐ Stage III (tissue loss extending into subcutaneous tissue)

   ☐ Stage IV (tissue loss extending to muscle and/or bone)

   ☐ unable to determine stage of wound in present state

2. Choice of Wound Dressing

   Identify the specific type of dressing that would be most appropriate for promoting maximum healing in the shortest amount of time for the wound in Case History #1.

   _____

   _____

   _____

3. Confidence in the Accuracy of Your Decision

   Place an X on the graph below to represent the level of confidence you have that the choice you have made is the most appropriate wound dressing.

   0 _____ 10

   absolutely no confidence complete confidence

   (0 means you have absolutely no confidence in your choice being the most appropriate and 10 means you have complete confidence that your choice is the most appropriate).

CASE HISTORY #2

Patient history - a 23 year old male quadriplegic who was hospitalized for pneumonia.

Description and location of wound - the width of the wound is 8 cm, length is 5 cm, shape is oval. The wound is clean and has no undermining or tunnelling. The surrounding skin is soft with no induration, redness, edema, or heat. There is no purulent drainage from the wound. The amount of drainage or exudate is minimal. The wound is located over the right buttock.

Photograph of wound

Case History #2 (Calgary Group A)

1. Assessment of Wound Depth

   ☐ Stage I (redness)

   ☐ Stage II (loss of superficial skin layer only)

   ☐ Stage III (tissue loss extending into subcutaneous tissue)

   ☐ Stage IV (tissue loss extending to muscle and/or bone)

   ☐ unable to determine stage of wound in present state

2. Choice of Wound Dressing

   Using the Chronic Wound Management Decision Tree as a reference, identify the specific type of dressing that would be most appropriate for promoting maximum healing in the shortest amount of time for the wound in Case History #2.

   _____

   _____

   _____

3. Confidence in the Accuracy of Your Decision

   Place an X on the graph below to represent the level of confidence you have that the choice you have made is the most appropriate wound dressing.

   0 _____ 10

   absolutely no confidence complete confidence

   (0 means you have absolutely no confidence in your choice being the most appropriate and 10 means you have complete confidence that your choice is the most appropriate).

Case History #2 (Edmonton Group, Calgary Group B)

1. Assessment of Wound Depth

   ☐ Stage I (redness)

   ☐ Stage II (loss of superficial skin layer only)

   ☐ Stage III (tissue loss extending into subcutaneous tissue)

   ☐ Stage IV (tissue loss extending to muscle and/or bone)

   ☐ unable to determine stage of wound in present state

2. Choice of Wound Dressing

   Identify the specific type of dressing that would be most appropriate for promoting maximum healing in the shortest amount of time for the wound in Case History #2.

   _____

   _____

   _____

3. Confidence in the Accuracy of Your Decision

   Place an X on the graph below to represent the level of confidence you have that the choice you have made is the most appropriate wound dressing.

   0 _____ 10

   absolutely no confidence complete confidence

   (0 means you have absolutely no confidence in your choice being the most appropriate and 10 means you have complete confidence that your choice is the most appropriate).

CASE HISTORY #3

Patient history - 73 year old male hospitalized following mitral valve replacement and multiple vessel coronary artery bypass surgery.

Description and location of wound - on inner aspect of the right lower extremity just above the ankle. There is no undermining, tracking or tunnelling. The wound depth is 3 mm, length is 5 cm, width is 3 cm, shape is oval. The wound is covered with a thick yellow fibrous tissue. There is minimal amount of drainage or exudate.

Photograph of wound

Case History #3 (Calgary Group A)

1. Assessment of Wound Depth

   ☐ Stage I (redness)

   ☐ Stage II (loss of superficial skin layer only)

   ☐ Stage III (tissue loss extending into subcutaneous tissue)

   ☐ Stage IV (tissue loss extending to muscle and/or bone)

   ☐ unable to determine stage of wound in present state

2. Choice of Wound Dressing

   Using the Chronic Wound Management Decision Tree as a reference, identify the specific type of dressing that would be most appropriate for promoting maximum healing in the shortest amount of time for the wound in Case History #3.

   _____

   _____

   _____

3. Confidence in the Accuracy of Your Decision

   Place an X on the graph below to represent the level of confidence you have that the choice you have made is the most appropriate wound dressing.

   0 _____ 10

   absolutely no confidence complete confidence

   (0 means you have absolutely no confidence in your choice being the most appropriate and 10 means you have complete confidence that your choice is the most appropriate)

Case History #3 (Edmonton Group, Calgary Group B)

1. Assessment of Wound Depth

   ☐ Stage I (redness)

   ☐ Stage II (loss of superficial skin layer only)

   ☐ Stage III (tissue loss extending into subcutaneous tissue)

   ☐ Stage IV (tissue loss extending to muscle and/or bone)

   ☐ unable to determine stage of wound in present state

2. Choice of Wound Dressing

   Identify the specific type of dressing that would be most appropriate for promoting maximum healing in the shortest amount of time for the wound in Case History #3.

   _____

   _____

   _____

3. Confidence in the Accuracy of Your Decision

   Place an X on the graph below to represent the level of confidence you have that the choice you have made is the most appropriate wound dressing.

   0 _____ 10

   absolutely no confidence complete confidence

   (0 means you have absolutely no confidence in your choice being the most appropriate and 10 means you have complete confidence that your choice is the most appropriate)

Appendix D

Study Explanation Letter

Dear Nursing Colleagues:

In _____, 1995 I will be conducting a study regarding clinical decision making in chronic wound management. You will be asked to participate in a study at your inservice/nursing meeting. Data collection will take about one half hour and will involve assessment of pictures of chronic wounds and identification of appropriate products for treatment. All responses will be anonymous and only grouped or aggregate data will be available on the completion of the study. Participation in the study is entirely voluntary and no record of who participated will be kept. No information from the study will be available for individual evaluation purposes.

Results from this study will assist in identifying interventions for improving clinical decision making. Study results may be presented at conferences or reported in the literature.

If you have any questions about this study, please phone Shaunne Letourneau (MN Candidate) 458-2524 or Dr. Louise Jensen (thesis supervisor) at 492-6795.

Sincerely,

Shaunne Catherine Letourneau

MN Candidate

Faculty of Nursing

University of Alberta

Appendix E

Instruction Sheet (Calgary Group A)

1. Read this page NOW!
2. Please do not open the envelope until directed to do so.

- These materials are a part of a replication study "Evaluation of a Chronic Wound Management Decision Tool in Clinical Practice".
- The purpose of this study is to examine the use of a decision support tool in wound management.
- Enclosed are case studies, including pictures, of chronic wounds. You will be asked to record how you would care for each wound. The Chronic Wound Management Decision Tree is enclosed as a reference.
- You will also be asked to provide some information about yourself, such as education and nursing experience. You will not be asked for your name. Individual responses will only be viewed by the researcher. Your responses are confidential and anonymous. Only grouped or aggregate information will be made available to you and other Home Care personnel. Data will be kept for seven years in a locked file.
- The study will take about 30 minutes.
- You do not have to participate in the study if you do not wish. No one will know that you have not participated unless you choose to tell them. Simply hand in the uncompleted materials at the same time as the others.
- If there are questions you prefer not to answer, just leave them out.
- Please return all study materials to the envelope when you are finished the case studies.

Instruction Sheet (Edmonton Group, Calgary Group B)

1. Read this page NOW!
2. Please do not open the enveloped until directed to do so.

- These materials are a part of a replication study "Evaluation of a Chronic Wound Management Decision Tool in Clinical Practice".
- The purpose of this study is to examine the use of a decision support tool in wound management.
- Enclosed are case studies, including pictures, of chronic wounds. You will be asked to record how you would care for each wound.
- You will also be asked to provide some information about yourself, such as education and nursing experience. You will not be asked for your name. Individual responses will only be viewed by the researcher. Your responses are confidential and anonymous. Only grouped or aggregate information will be made available to you and other Home Care personnel. Data will be kept for seven years in a locked file.
- The study will take about 30 minutes.
- You do not have to participate in the study if you do not wish. No one will know that you have not participated unless you choose to tell them. Simply hand in the uncompleted materials at the same time as the others.
- If there are questions you prefer not to answer, just leave them out.
- Please return all materials to the envelope when you have finished the case studies.